

## SEQUENCE LISTING

<110> Ehrhardt, Thomas  
 Lerchl, Jens  
 Nigel, Marc Stitt  
 Zenner, Rita

<120> Plant dihydroorotase

<130> 0050/50716

<140> US 10/070,277

<141> Filing date not yet granted

<150> PCT/EP00/08581

<151> 2000-09-02

<160> 9

<170> WordPerfect version 6.1

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 <212> DNA  
 <213> Solanum tuberosum

<220>  
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 <222> (9)..(1046)

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ctc cgt gat ggt gat gtt ctt aag gca gtt gtc tct cac agt gca cat	98
Leu Arg Asp Gly Asp Val Leu Lys Ala Val Val Ser His Ser Ala His	
15 20 25 30	
cac ttt ggg agg gca ata gtc atg cca aat ttg aag cct cct atc act	146
His Phe Gly Arg Ala Ile Val Met Pro Asn Leu Lys Pro Pro Ile Thr	
35 40 45	
acc act gct gct gct gta gca tac cgg gag gcg ata ttg aaa tct tta	194
Thr Thr Ala Ala Ala Val Ala Tyr Arg Glu Ala Ile Leu Lys Ser Leu	
50 55 60	
cct gtt gat agt gat ttc aac cct ctt atg aca ctt tat ttg aca gat	242
Pro Val Asp Ser Asp Phe Asn Pro Leu Met Thr Leu Tyr Leu Thr Asp	
65 70 75	
aca acc agt cct atg gaa atc aaa cta gca aga gag agc cag gtc gta	290
Thr Thr Ser Pro Met Glu Ile Lys Leu Ala Arg Glu Ser Gln Val Val	
80 85 90	
ttt ggg gtg aag ttg tac cct gct ggt gcc acg aca aat tct caa gat	338
Phe Gly Val Lys Leu Tyr Pro Ala Gly Ala Thr Thr Asn Ser Gln Asp	

95	100	105	110	
gga gtg act gat ctt ttc ggg aag tgt tta cca gtt cta caa gaa atg Gly Val Thr Asp Leu Phe Gly Lys Cys Leu Pro Val Leu Gln Glu Met 115 120 125				386
gtt gag cat aat atg cct ctg ctg gtt cat gga gag gtt act aat cct Val Glu His Asn Met Pro Leu Leu Val His Gly Glu Val Thr Asn Pro 130 135 140				434
gag gtt gac atg ttt gat aga gaa aag gta ttc att gaa acg gtt cta Glu Val Asp Met Phe Asp Arg Glu Lys Val Phe Ile Glu Thr Val Leu 145 150 155				482
aga ccg ttg gtg cag aaa ttt cca caa ttg aag gtc gtg atg gag cat Arg Pro Leu Val Gln Lys Phe Pro Gln Leu Lys Val Val Met Glu His 160 165 170				530
gtt acc acc att gat gct gtt aag ttt gtt gaa tct tgc act gaa gga Val Thr Thr Ile Asp Ala Val Lys Phe Val Glu Ser Cys Thr Glu Gly 175 180 185 190				578
ttt gtt gca gca act gtc acc cca caa cat ctt gtt ttg aac agg aat Phe Val Ala Ala Thr Val Thr Pro Gln His Leu Val Leu Asn Arg Asn 195 200 205				626
tct ctc ttc caa ggg ggc tta caa ccg cat aat tac tgc ctt cca gtc Ser Leu Phe Gln Gly Gly Leu Gln Pro His Asn Tyr Cys Leu Pro Val 210 215 220				674
ctc aaa aga gag atc cac agg gag gca ctt gtg tca gct gta aca agt Leu Lys Arg Glu Ile His Arg Glu Ala Leu Val Ser Ala Val Thr Ser 225 230 235				722
gga agt aaa aga ttt ttt ctt ggg act gat agt gct cct cat gat aga Gly Ser Lys Arg Phe Phe Leu Gly Thr Asp Ser Ala Pro His Asp Arg 240 245 250				770
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gta gcc ttg tca gta tat gcg aag gtg ttt gaa aag gaa aat gca ctc Val Ala Leu Ser Val Tyr Ala Lys Val Phe Glu Lys Glu Asn Ala Leu 275 280 285				866
gac aag ctt gaa gca ttc act agc ttc aat gga cca gat ttt tat ggg Asp Lys Leu Glu Ala Phe Thr Ser Phe Asn Gly Pro Asp Phe Tyr Gly 290 295 300				914
ctt cct agg aac aac tca aag att aag ttg agt aag acg cca tgg aag Leu Pro Arg Asn Asn Ser Lys Ile Lys Leu Ser Lys Thr Pro Trp Lys 305 310 315				962
gta ccc gaa tcc ttt tct tat gca tca gga gat att att ccc atg ttt Val Pro Glu Ser Phe Ser Tyr Ala Ser Gly Asp Ile Ile Pro Met Phe 320 325 330				1010
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Ala Gly Glu Met Leu Asp Trp Leu Pro Ala Pro Leu  
 335 340 345

ttgtcattct tgtactgtaa tattgtgatt caaccaaaga tatagactgt aggtgtatca 1116  
 tcttttcttt catgttgatt agatattatc acgatgataa tctcctttca gctaataaat 1176  
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 <213> Solanum tuberosum

<400> 2

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 35 40 45  
 Ala Ala Ala Val Ala Tyr Arg Glu Ala Ile Leu Lys Ser Leu Pro Val  
 50 55 60  
 Asp Ser Asp Phe Asn Pro Leu Met Thr Leu Tyr Leu Thr Asp Thr Thr  
 65 70 75 80  
 Ser Pro Met Glu Ile Lys Leu Ala Arg Glu Ser Gln Val Val Phe Gly  
 85 90 95  
 Val Lys Leu Tyr Pro Ala Gly Ala Thr Thr Asn Ser Gln Asp Gly Val  
 100 105 110  
 Thr Asp Leu Phe Gly Lys Cys Leu Pro Val Leu Gln Glu Met Val Glu  
 115 120 125  
 His Asn Met Pro Leu Leu Val His Gly Glu Val Thr Asn Pro Glu Val  
 130 135 140  
 Asp Met Phe Asp Arg Glu Lys Val Phe Ile Glu Thr Val Leu Arg Pro  
 145 150 155 160  
 Leu Val Gln Lys Phe Pro Gln Leu Lys Val Val Met Glu His Val Thr  
 165 170 175  
 Thr Ile Asp Ala Val Lys Phe Val Glu Ser Cys Thr Glu Gly Phe Val  
 180 185 190  
 Ala Ala Thr Val Thr Pro Gln His Leu Val Leu Asn Arg Asn Ser Leu  
 195 200 205

Phe Gln Gly Gly Leu Gln Pro His Asn Tyr Cys Leu Pro Val Leu Lys  
 210 215 220

Arg Glu Ile His Arg Glu Ala Leu Val Ser Ala Val Thr Ser Gly Ser  
 225 230 235 240

Lys Arg Phe Phe Leu Gly Thr Asp Ser Ala Pro His Asp Arg Arg Arg  
 245 250 255

Lys Glu Cys Ser Cys Gly Cys Ala Gly Ile Tyr Asn Ala Pro Val Ala  
 260 265 270

Leu Ser Val Tyr Ala Lys Val Phe Glu Lys Glu Asn Ala Leu Asp Lys  
 275 280 285

Leu Glu Ala Phe Thr Ser Phe Asn Gly Pro Asp Phe Tyr Gly Leu Pro  
 290 295 300

Arg Asn Asn Ser Lys Ile Lys Leu Ser Lys Thr Pro Trp Lys Val Pro  
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<212> DNA

<213> Nicotiana tabacum

<220>

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<222> (305)..(1678)

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ttgtacactc ccattgtcgc ttccagtttt gtgccccaaa taaccttttc agtcattttgt 180

atcttagcat caacaacagt tgctgtctct cttttgttcg tccaatatac tgagcatttt 240

ttgagtagta atttgaaggg tttattcagt tgtaaataat ttgatttttg ttttgtttaa 300

gaaa atg aga caa agg gtt gga ttt gca ttg att aga gaa agc ttg tat 349  
 Met Arg Gln Arg Val Gly Phe Ala Leu Ile Arg Glu Ser Leu Tyr  
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cgt aag cta aaa cca agc tct gtt ccc aga cat tat tgc act tct tct 397  
 Arg Lys Leu Lys Pro Ser Ser Val Pro Arg His Tyr Cys Thr Ser Ser  
 20 25 30

tca gct aat gtt cct cct att cct cca cct aag att cct cat tct tct 445  
 Ser Ala Asn Val Pro Pro Ile Pro Pro Pro Lys Ile Pro His Ser Ser  
 35 40 45

aaa aag gga agg ttg ttt aca gga gcc act att ggt cta cta ata gct	493
Lys Lys Gly Arg Leu Phe Thr Gly Ala Thr Ile Gly Leu Leu Ile Ala	
50 55 60	
ggg gga gct tat gca agt acg gtt gat gag gcc acc ttc tgt ggc tgg	541
Gly Gly Ala Tyr Ala Ser Thr Val Asp Glu Ala Thr Phe Cys Gly Trp	
65 70 75	
cta ttc tca gca aca aaa cta gta aat ccg ttc ttt gca ttt ctg gat	589
Leu Phe Ser Ala Thr Lys Leu Val Asn Pro Phe Phe Ala Phe Leu Asp	
80 85 90 95	
cca gag gtt gct cac aaa ctg gcg gtc tct gct gca gcc cga gga tgg	637
Pro Glu Val Ala His Lys Leu Ala Val Ser Ala Ala Arg Gly Trp	
100 105 110	
gtt cca agg gag aag agg cca gat cct cct ata ttg ggc ctt gat gtg	685
Val Pro Arg Glu Lys Arg Pro Asp Pro Pro Ile Leu Gly Leu Asp Val	
115 120 125	
tgg gga aga agg ttc tca aat cct gtt ggt ctt gct gct ggt ttt gac	733
Trp Gly Arg Arg Phe Ser Asn Pro Val Gly Leu Ala Ala Gly Phe Asp	
130 135 140	
aag aat gct gag gct gtt gaa gga ttg ctt gga tta ggt ttt ggc ttt	781
Lys Asn Ala Glu Ala Val Glu Gly Leu Leu Gly Leu Gly Phe Gly Phe	
145 150 155	
gtt gag gtt ggc tca gta act ccc att cca cag gaa ggc aac cca aaa	829
Val Glu Val Gly Ser Val Thr Pro Ile Pro Gln Glu Gly Asn Pro Lys	
160 165 170 175	
cca cgt ata ttt agg ttg cca aat gaa ggt gct ata ata aat agg tgt	877
Pro Arg Ile Phe Arg Leu Pro Asn Glu Gly Ala Ile Ile Asn Arg Cys	
180 185 190	
ggc ttc aat agt gaa gga atc gtt gtg gtt gcc aaa cga ttg ggt gct	925
Gly Phe Asn Ser Glu Gly Ile Val Val Val Ala Lys Arg Leu Gly Ala	
195 200 205	
cag cat ggt aag aga aag ttg gaa aca tct agt act tca tct cca gct	973
Gln His Gly Lys Arg Lys Leu Glu Thr Ser Ser Thr Ser Ser Pro Ala	
210 215 220	
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Gly Asp Glu Val Lys His Gly Gly Lys Ala Gly Pro Gly Ile Leu Gly	
225 230 235	
gtt aac ctt gga aag aat aaa aca agt gaa gac gct gca gca gat tat	1069
Val Asn Leu Gly Lys Asn Lys Thr Ser Glu Asp Ala Ala Ala Asp Tyr	
240 245 250 255	
gtg caa gga gtc cat aca tta tct cag tat gct gac tac ttg gta att	1117
Val Gln Gly Val His Thr Leu Ser Gln Tyr Ala Asp Tyr Leu Val Ile	
260 265 270	
aat atc tca tcc cca aat act cca gga cta cgc cag ctt cag gga aga	1165
Asn Ile Ser Ser Pro Asn Thr Pro Gly Leu Arg Gln Leu Gln Gly Arg	

aag cag ttg aag gat ctt gtg aag aag gtt caa gca gct cgt gat gaa	1213
Lys Gln Leu Lys Asp Leu Val Lys Lys Val Gln Ala Ala Arg Asp Glu	
275 290 295 300	
atg cag tgg ggt gag gaa gga cct ccg cct tta ctt gtg aaa att gct	1261
Met Gln Trp Gly Glu Glu Gly Pro Pro Pro Leu Leu Val Lys Ile Ala	
305 310 315	
cca gat ttg tct aaa caa gat ctt gaa gat att gca gtg gtg gct gtt	1309
Pro Asp Leu Ser Lys Gln Asp Leu Glu Asp Ile Ala Val Val Ala Val	
320 325 330 335	
gct ctt cgt gtg gat gga ctg att ata tca aat act act gtc caa aga	1357
Ala Leu Arg Val Asp Gly Leu Ile Ile Ser Asn Thr Thr Val Gln Arg	
340 345 350	
cca gat tcc ata agt caa aac cct gtg gct caa gag gct ggt ggc ttg	1405
Pro Asp Ser Ile Ser Gln Asn Pro Val Ala Gln Glu Ala Gly Gly Leu	
355 360 365	
agt ggg aag cca ctc ttt gac atg tca aca aat ata ctg aag gag atg	1453
Ser Gly Lys Pro Leu Phe Asp Met Ser Thr Asn Ile Leu Lys Glu Met	
370 375 380	
tac gtt ctg act aag gga agg att cct ctg att ggc act ggg ggt att	1501
Tyr Val Leu Thr Lys Gly Arg Ile Pro Leu Ile Gly Thr Gly Gly Ile	
385 390 395	
agc agt ggc gag gat gct tac aag aaa att cga gct ggt gcc act ctt	1549
Ser Ser Gly Glu Asp Ala Tyr Lys Lys Ile Arg Ala Gly Ala Thr Leu	
400 405 410 415	
gtt cag ctt tat aca gca ttt gca tat gga ggc cct gca ctt atc ccc	1597
Val Gln Leu Tyr Thr Ala Phe Ala Tyr Gly Gly Pro Ala Leu Ile Pro	
420 425 430	
gat ata aag gat gaa ctt gct cgt tgc tta gaa aag gat ggt tat aag	1645
Asp Ile Lys Asp Glu Leu Ala Arg Cys Leu Glu Lys Asp Gly Tyr Lys	
435 440 445	
tca atc agt gag gct gtt gga gca gac tgc aga tagtagtagt tgatatacta	1698
Ser Ile Ser Glu Ala Val Gly Ala Asp Cys Arg	
450 455	
aaccagtctt ttgagtttga ggggcagagc acatttttgc cacttataat aaatgatata	1758
tttatggttt cctcccatgt ggcgtcatat catttgcttc gtaatttgtg atgtcttccc	1818
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&lt;213&gt; Nicotiana tabacum

&lt;400&gt; 4

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 35 40 45  
 Lys Gly Arg Leu Phe Thr Gly Ala Thr Ile Gly Leu Leu Ile Ala Gly  
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 Gly Ala Tyr Ala Ser Thr Val Asp Glu Ala Thr Phe Cys Gly Trp Leu  
 65 70 75 80  
 Phe Ser Ala Thr Lys Leu Val Asn Pro Phe Phe Ala Phe Leu Asp Pro  
 85 90 95  
 Glu Val Ala His Lys Leu Ala Val Ser Ala Ala Ala Arg Gly Trp Val  
 100 105 110  
 Pro Arg Glu Lys Arg Pro Asp Pro Pro Ile Leu Gly Leu Asp Val Trp  
 115 120 125  
 Gly Arg Arg Phe Ser Asn Pro Val Gly Leu Ala Ala Gly Phe Asp Lys  
 130 135 140  
 Asn Ala Glu Ala Val Glu Gly Leu Leu Gly Leu Gly Phe Gly Phe Val  
 145 150 155 160  
 Glu Val Gly Ser Val Thr Pro Ile Pro Gln Glu Gly Asn Pro Lys Pro  
 165 170 175  
 Arg Ile Phe Arg Leu Pro Asn Glu Gly Ala Ile Ile Asn Arg Cys Gly  
 180 185 190  
 Phe Asn Ser Glu Gly Ile Val Val Val Ala Lys Arg Leu Gly Ala Gln  
 195 200 205  
 His Gly Lys Arg Lys Leu Glu Thr Ser Ser Thr Ser Ser Pro Ala Gly  
 210 215 220  
 Asp Glu Val Lys His Gly Gly Lys Ala Gly Pro Gly Ile Leu Gly Val  
 225 230 235 240  
 Asn Leu Gly Lys Asn Lys Thr Ser Glu Asp Ala Ala Ala Asp Tyr Val  
 245 250 255  
 Gln Gly Val His Thr Leu Ser Gln Tyr Ala Asp Tyr Leu Val Ile Asn  
 260 265 270  
 Ile Ser Ser Pro Asn Thr Pro Gly Leu Arg Gln Leu Gln Gly Arg Lys  
 275 280 285  
 Gln Leu Lys Asp Leu Val Lys Lys Val Gln Ala Ala Arg Asp Glu Met

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Asp Leu Ser Lys Gln Asp Leu Glu Asp Ile Ala Val Val Ala Val Ala		
	325	330 335
Leu Arg Val Asp Gly Leu Ile Ile Ser Asn Thr Thr Val Gln Arg Pro		
	340	345 350
Asp Ser Ile Ser Gln Asn Pro Val Ala Gln Glu Ala Gly Gly Leu Ser		
	355	360 365
Gly Lys Pro Leu Phe Asp Met Ser Thr Asn Ile Leu Lys Glu Met Tyr		
	370	375 380
Val Leu Thr Lys Gly Arg Ile Pro Leu Ile Gly Thr Gly Gly Ile Ser		
	385	390 395 400
Ser Gly Glu Asp Ala Tyr Lys Lys Ile Arg Ala Gly Ala Thr Leu Val		
	405	410 415
Gln Leu Tyr Thr Ala Phe Ala Tyr Gly Gly Pro Ala Leu Ile Pro Asp		
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 <212> DNA  
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<212> DNA  
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